



SEQUENCE LISTING

(1) GENERAL INFORMATION:

(i) APPLICANT: Bazin, Hervé
Latinne, Dominique
Kaplan, Ruth
Kieber-Emmons, Thomas
Postema, Christina E.
White-Scharf, Mary

(ii) TITLE OF INVENTION: LO-CD2a Antibody and Uses
Thereof for Inhibiting
T-Cell Activation and
Proliferation

(iii) NUMBER OF SEQUENCES: 96

(iv) CORRESPONDENCE ADDRESS:

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(F) ZIP: 07068

(v) COMPUTER READABLE FORM:

(A) MEDIUM TYPE: 3.5 inch diskette

(B) COMPUTER: IBM PS/2

(C) OPERATING SYSTEM: MS-DOS

76

74

(D) SOFTWARE: WordPerfect 5.1

(vi) CURRENT APPLICATION DATA:

- (A) APPLICATION NUMBER: 08/477,989
- (B) FILING DATE: 07-JUN-1995
- (C) CLASSIFICATION:

(vii) PRIOR APPLICATION DATA:

- (A) APPLICATION NUMBER: 08/407,009
- (B) FILING DATE: 29-MAR-1995
- (A) APPLICATION NUMBER: 08/119,032
- (B) FILING DATE: 09-SEP-1993
- (A) APPLICATION NUMBER: 08/027,008
- (B) FILING DATE: 05-MAR-1993

(viii) ATTORNEY/AGENT INFORMATION:

- (A) NAME: Olstein, Elliot M.
- (B) REGISTRATION NUMBER: 24,025
- (C) REFERENCE/DOCKET NUMBER: 61750-147

(ix) TELECOMMUNICATION INFORMATION:

- (A) TELEPHONE: 201-994-1700
- (B) TELEFAX: 201-994-1744

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15

77

(2) INFORMATION FOR SEQ ID NO: 1:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 32 bases
- (B) TYPE: nucleic acid
- (C) STRANDEDNESS: single
- (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: oligonucleotide

(ix) FEATURE:

- (A) NAME/KEY: PCR primer

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 1:

AACCCGGGGA CATTAGCTG ACCCAGTCTC AA

32

(2) INFORMATION FOR SEQ ID NO: 2:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 29 bases
- (B) TYPE: nucleic acid
- (C) STRANDEDNESS: single
- (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: oligonucleotide

(ix) FEATURE:

- (A) NAME/KEY: PCR primer

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 2:

CAGTCGACTA CAGTTGGTGC AGCATCAGC

29

3-
76

78

(2) INFORMATION FOR SEQ ID NO: 3:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 31 bases
- (B) TYPE: nucleic acid
- (C) STRANDEDNESS: single
- (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: oligonucleotide

(ix) FEATURE:

- (A) NAME/KEY: PCR primer

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 3:

AACCCGGGGA GGTCCAGCTG CAGCAGTCTG G

31

(2) INFORMATION FOR SEQ ID NO: 4:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 27 bases
- (B) TYPE: nucleic acid
- (C) STRANDEDNESS: single
- (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: oligonucleotide

(ix) FEATURE:

- (A) NAME/KEY: PCR primer

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 4:

AAGTCGACCC AGTGGATAGA CCGATGG

27

42
77

79

(2) INFORMATION FOR SEQ ID NO: 5:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 22 bases
- (B) TYPE: nucleic acid
- (C) STRANDEDNESS: single
- (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: oligonucleotide

(ix) FEATURE:

- (A) NAME/KEY: PCR primer

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 5:

CCGCAAGCTT CATGGATGG AG

22

(2) INFORMATION FOR SEQ ID NO: 6:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 27 bases
- (B) TYPE: nucleic acid
- (C) STRANDEDNESS: single
- (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: oligonucleotide

(ix) FEATURE:

- (A) NAME/KEY: PCR primer

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 6:

GCTGCTTGGG GACTGGGTCA GCTGGAT

27

-5-
78

80

(2) INFORMATION FOR SEQ ID NO: 7:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 21 bases
- (B) TYPE: nucleic acid
- (C) STRANDEDNESS: single
- (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: oligonucleotide

(ix) FEATURE:

- (A) NAME/KEY: PCR primer

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 7:

ATTCAGCTGA CCCAGTCTCC A

21

(2) INFORMATION FOR SEQ ID NO: 8:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 58 bases
- (B) TYPE: nucleic acid
- (C) STRANDEDNESS: single
- (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: oligonucleotide

(ix) FEATURE:

- (A) NAME/KEY: PCR primer

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 8:

GATCGGATCC ACCTGAGGAA GCAAAGTTTA AATTCTACTC ACGTTTCAGT TCCAGCTT

58

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79

81

(2) INFORMATION FOR SEQ ID NO: 9:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 31 bases
- (B) TYPE: nucleic acid
- (C) STRANDEDNESS: single
- (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: oligonucleotide

(ix) FEATURE:

- (A) NAME/KEY: PCR primer

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 9:

TCTCCTGCAG TGGGACCTCG GAGTGGACAC C

31

(2) INFORMATION FOR SEQ ID NO: 10:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 21 bases
- (B) TYPE: nucleic acid
- (C) STRANDEDNESS: single
- (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: oligonucleotide

(ix) FEATURE:

- (A) NAME/KEY: PCR primer

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 10:

GAGGTCCAGC TGCAGCAGTC T

21

7
80

82

(2) INFORMATION FOR SEQ ID NO: 11:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 24 bases
- (B) TYPE: nucleic acid
- (C) STRANDEDNESS: single
- (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: oligonucleotide

(ix) FEATURE:

- (A) NAME/KEY: PCR primer

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 11:

CGATGTATCA GCTGTCAGTG TGGC

24

(2) INFORMATION FOR SEQ ID NO: 12:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 24 bases
- (B) TYPE: nucleic acid
- (C) STRANDEDNESS: single
- (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: oligonucleotide

(ix) FEATURE:

- (A) NAME/KEY: PCR primer

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 12:

GCCACACTGA CAGCTGATAC ATCG

24

~~8~~
81

83

(2) INFORMATION FOR SEQ ID NO: 13:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 21 bases
- (B) TYPE: nucleic acid
- (C) STRANDEDNESS: single
- (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: oligonucleotide

(ix) FEATURE:

- (A) NAME/KEY: PCR primer

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 13:

CAGAGTGCCT TGGCCCCAGT A

21

(2) INFORMATION FOR SEQ ID NO: 14:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 27 bases
- (B) TYPE: nucleic acid
- (C) STRANDEDNESS: single
- (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: oligonucleotide

(ix) FEATURE:

- (A) NAME/KEY: PCR primer

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 14:

TACTGGGGCC AAGGCACCCCT CGTCACA

27

9
82

84

(2) INFORMATION FOR SEQ ID NO: 15:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 25 bases
- (B) TYPE: nucleic acid
- (C) STRANDEDNESS: single
- (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: oligonucleotide

(ix) FEATURE:

- (A) NAME/KEY: PCR primer

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 15:

GATCGGATCC CTATAAATCT CTGGC

25

(2) INFORMATION FOR SEQ ID NO: 16:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 43 bases
- (B) TYPE: nucleic acid
- (C) STRANDEDNESS: single
- (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: oligonucleotide

(ix) FEATURE:

- (A) NAME/KEY: PCR primer

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 16:

TTGGATCCGC GGCCGGCGTCG ACTACAGTTG GTGCAGCATC AGC

43

-10-
83

85

(2) INFORMATION FOR SEQ ID NO: 17:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 41 bases
- (B) TYPE: nucleic acid
- (C) STRANDEDNESS: single
- (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: oligonucleotide

(ix) FEATURE:

- (A) NAME/KEY: PCR primer

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 17:

ATGGATCCGC GGCCGCGTCG ACCCAGTGGA TAGACCGATG G

41

(2) INFORMATION FOR SEQ ID NO: 18:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 31 bases
- (B) TYPE: nucleic acid
- (C) STRANDEDNESS: single
- (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: oligonucleotide

(ix) FEATURE:

- (A) NAME/KEY: PCR primer

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 18:

CCATGGCCTC GAGGGCCCCC CCCCCCCCCC C

31

-11
84

86

(2) INFORMATION FOR SEQ ID NO: 19:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 29 bases
- (B) TYPE: nucleic acid
- (C) STRANDEDNESS: single
- (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: oligonucleotide

(ix) FEATURE:

- (A) NAME/KEY: PCR primer

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 19:

CCTGTTAGG CCTCTGCTTC ACCCAGTAC

29

(2) INFORMATION FOR SEQ ID NO: 20:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 29 bases
- (B) TYPE: nucleic acid
- (C) STRANDEDNESS: single
- (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: oligonucleotide

(ix) FEATURE:

- (A) NAME/KEY: PCR primer

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 20:

GGATAATGGG TAAATTGCAT GCAGTAATA

29

~~-12-~~
85

87

(2) INFORMATION FOR SEQ ID NO: 21:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 30 bases
- (B) TYPE: nucleic acid
- (C) STRANDEDNESS: single
- (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: oligonucleotide

(ix) FEATURE:

- (A) NAME/KEY: PCR primer

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 21:

TGCAAGCTTC ATGATGAGTC CTGTCCAGTC

30

(2) INFORMATION FOR SEQ ID NO: 22:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 28 bases
- (B) TYPE: nucleic acid
- (C) STRANDEDNESS: single
- (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: oligonucleotide

(ix) FEATURE:

- (A) NAME/KEY: PCR primer

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 22:

AGTAAGCTTC ATGAAATGCA GGTGGATC

28

-13-
86

88

(2) INFORMATION FOR SEQ ID NO: 23:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 24 bases
- (B) TYPE: nucleic acid
- (C) STRANDEDNESS: single
- (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: oligonucleotide

(ix) FEATURE:

- (A) NAME/KEY: PCR primer

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 23:

GGGAGATTGC TGCAGCTGGA CTTC

24

(2) INFORMATION FOR SEQ ID NO: 24:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 33 bases
- (B) TYPE: nucleic acid
- (C) STRANDEDNESS: single
- (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: oligonucleotide

(ix) FEATURE:

- (A) NAME/KEY: PCR primer

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 24:

GATCCCCGGG CCACCATGAT GAGTCCTGTC CAG

33

(2) INFORMATION FOR SEQ ID NO: 25:

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81

89

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 61 bases
- (B) TYPE: nucleic acid
- (C) STRANDEDNESS: single
- (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: oligonucleotide

(ix) FEATURE:

- (A) NAME/KEY: PCR primer

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 25:

AGAATGGCCA CGTCATCCGA CCCCCTCAGA GTTTACTATT CTACTATCCA ACTGAGGAAG	60
C	61

(2) INFORMATION FOR SEQ ID NO: 26:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 34 bases
- (B) TYPE: nucleic acid
- (C) STRANDEDNESS: single
- (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: oligonucleotide

(ix) FEATURE:

- (A) NAME/KEY: PCR primer

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 26:

GATCGAATTC GCCACCATGA AATGCAGGTG GATC	34
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15
88

90

(2) INFORMATION FOR SEQ ID NO: 27:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 37 bases
- (B) TYPE: nucleic acid
- (C) STRANDEDNESS: single
- (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: oligonucleotide

(ix) FEATURE:

- (A) NAME/KEY: PCR primer

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 27:

CCAGAAAGCT AGCTTGCCAT CCCTATAAAT CTCTGGC

37

(2) INFORMATION FOR SEQ ID NO: 28:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 23 amino acids
- (B) TYPE: amino acid
- (C) STRANDEDNESS:
- (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: polypeptide

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 28:

Asp Val Val Leu Thr Gln Thr Pro Pro Thr

5

10

Leu Leu Ala Thr Ile Gly Gln Ser Val Ser

15

20

Ile Ser Cys

*-16-
89*

9/

(2) INFORMATION FOR SEQ ID NO: 29:

(i) SEQUENCE CHARACTERISTICS:

(A) LENGTH: 23 amino acids

(B) TYPE: amino acid

(C) STRANDEDNESS:

(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: polypeptide

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 29:

Asp Val Val Met Thr Gln Ser Pro Leu Ser

5

10

Leu Pro Val Thr Leu Gly Gln Pro Ala Ser

15

20

Ile Ser Cys

(2) INFORMATION FOR SEQ ID NO: 30:

(i) SEQUENCE CHARACTERISTICS:

(A) LENGTH: 15 amino acids

(B) TYPE: amino acid

(C) STRANDEDNESS:

(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: polypeptide

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 30:

Trp Leu Leu Gln Arg Thr Gly Gln Ser Pro

5

10

Gln Pro Leu Ile Tyr

17
90

92

(2) INFORMATION FOR SEQ ID NO: 31:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 15 amino acids
- (B) TYPE: amino acid
- (C) STRANDEDNESS:
- (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: polypeptide

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 31:

Trp Phe Gln Gln Arg Pro Gly Gln Ser Pro

5

10

Arg Arg Leu Ile Tyr

15

(2) INFORMATION FOR SEQ ID NO: 32:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 32 amino acids
- (B) TYPE: amino acid
- (C) STRANDEDNESS:
- (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: polypeptide

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 32:

Gly Val Pro Asn Arg Phe Ser Gly

5

10

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91

93

Ser Gly Thr Asp Phe Thr Leu Lys Ile Ser

15

20

Gly Val Glu Ala Glu Asp Leu Gly Val Tyr

25

30

Tyr Cys

(2) INFORMATION FOR SEQ ID NO: 33:

(i) SEQUENCE CHARACTERISTICS:

(A) LENGTH: 32 amino acids

(B) TYPE: amino acid

(C) STRANDEDNESS:

(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: polypeptide

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 33:

Gly Val Pro Asp Arg Phe Ser Gly Ser Gly

5

10

Ser Gly Thr Asp Phe Thr Leu Lys Ile Ser

15

20

Arg Val Glu Ala Glu Asp Val Gly Val Tyr

25

30

Tyr Cys

(2) INFORMATION FOR SEQ ID NO: 34:

(i) SEQUENCE CHARACTERISTICS:

(A) LENGTH: 10 amino acids

19
92

94

- (B) TYPE: amino acid
- (C) STRANDEDNESS:
- (D) TOPOLOGY: linear

- (ii) MOLECULE TYPE: polypeptide
- (xi) SEQUENCE DESCRIPTION: SEQ ID NO: 34:

Phe Gly Ala Gly Thr Lys Leu Glu Leu Lys

5 10

(2) INFORMATION FOR SEQ ID NO: 35:

- (i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 10 amino acids
- (B) TYPE: amino acid
- (C) STRANDEDNESS:
- (D) TOPOLOGY: linear

- (ii) MOLECULE TYPE: polypeptide
- (xi) SEQUENCE DESCRIPTION: SEQ ID NO: 35:

Phe Gly Gln Gly Thr Lys Leu Glu Ile Lys

5 10

(2) INFORMATION FOR SEQ ID NO: 36:

- (i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 81 bases
- (B) TYPE: nucleic acid
- (C) STRANDEDNESS: single
- (D) TOPOLOGY: linear

~~-20~~
93

95

(ii) MOLECULE TYPE: oligonucleotide

(ix) FEATURE:

(A) NAME/KEY: PCR primer

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 36:

GCAAGAGATG GAAGCTGGTT GTCCAAGGT TACCAATAAT GAAGGTGGAC TCTGGGTCA	60
CACAAACATCA CCATTGGTTC C	81

(2) INFORMATION FOR SEQ ID NO: 37:

(i) SEQUENCE CHARACTERISTICS:

(A) LENGTH: 72 bases

(B) TYPE: nucleic acid

(C) STRANDEDNESS: single

(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: oligonucleotide

(ix) FEATURE:

(A) NAME/KEY: PCR primer

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 37:

CAACCAGCTT CCATCTCTTG CAGGTCAAGT CAGAGTCTCT TACATAGTAG TGGAAACACC	60
TATTTAAATT GG	72

(2) INFORMATION FOR SEQ ID NO: 38:

(i) SEQUENCE CHARACTERISTICS:

(A) LENGTH: 81 bases

(B) TYPE: nucleic acid

(C) STRANDEDNESS: single

(D) TOPOLOGY: linear

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94

96

(ii) MOLECULE TYPE: oligonucleotide

(ix) FEATURE:

(A) NAME/KEY: PCR primer

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 38:

AGATTCCAGT TTGGATACCA AATAAATTAG CGGCTGTGGA GATTGGCCTG GCCTTAGCAA	60
CCAATTTAAA TAGGTGTTTC C	81

(2) INFORMATION FOR SEQ ID NO: 39:

(i) SEQUENCE CHARACTERISTICS:

(A) LENGTH: 81 bases

(B) TYPE: nucleic acid

(C) STRANDEDNESS: single

(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: oligonucleotide

(ix) FEATURE:

(A) NAME/KEY: PCR primer

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 39:

TTGGTATCCA AACTGGAATC TGGGGTCCCC GACAGGTTCA GTGGCTCAGG GAGTGGAAACA	60
GATTTCACAC TCAAAATCAG T	81

(2) INFORMATION FOR SEQ ID NO: 40:

(i) SEQUENCE CHARACTERISTICS:

(A) LENGTH: 72 bases

(B) TYPE: nucleic acid

(C) STRANDEDNESS: single

(D) TOPOLOGY: linear

22-
95

97

(ii) MOLECULE TYPE: oligonucleotide

(ix) FEATURE:

(A) NAME/KEY: PCR primer

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 40:

ATGGGTAAAT TGCATGCAGT AATAAACCCC CACATCCTCA GCTTCCACTC CACTGATTT	60
GAGTGTGAAA TC	72

(2) INFORMATION FOR SEQ ID NO: 41:

(i) SEQUENCE CHARACTERISTICS:

(A) LENGTH: 63 bases

(B) TYPE: nucleic acid

(C) STRANDEDNESS: single

(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: oligonucleotide

(ix) FEATURE:

(A) NAME/KEY: PCR primer

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 41:

TACTGCATGC AATTTACCCA TTATCCGTAC ACGTTGGAC AAGGGACCAA GCTGGAAATC	60
AAA	63

(2) INFORMATION FOR SEQ ID NO: 42:

(i) SEQUENCE CHARACTERISTICS:

(A) LENGTH: 67 bases

(B) TYPE: nucleic acid

(C) STRANDEDNESS: single

(D) TOPOLOGY: linear

*23-
96*

98

(ii) MOLECULE TYPE: oligonucleotide

(ix) FEATURE:

(A) NAME/KEY: PCR primer

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 42:

GATCGGATCC AACTGAGGAA GCAAAGTTTA AATTCTACTC ACGTTTGATT TCCAGCTTGG 60
TCCCTTG 67

(2) INFORMATION FOR SEQ ID NO: 43:

(i) SEQUENCE CHARACTERISTICS:

(A) LENGTH: 23 bases

(B) TYPE: nucleic acid

(C) STRANDEDNESS: single

(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: oligonucleotide

(ix) FEATURE:

(A) NAME/KEY: PCR primer

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 43:

GATCAAGCTT CATGATGAGT CCT 23

(2) INFORMATION FOR SEQ ID NO: 44:

(i) SEQUENCE CHARACTERISTICS:

(A) LENGTH: 21 bases

(B) TYPE: nucleic acid

(C) STRANDEDNESS: single

(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: oligonucleotide

-24-
97

99

(ix) FEATURE:

(A) NAME/KEY: PCR primer

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 44:

GCAAGAGATG GAAGCTGGTT G

21

(2) INFORMATION FOR SEQ ID NO: 45:

(i) SEQUENCE CHARACTERISTICS:

(A) LENGTH: 21 bases

(B) TYPE: nucleic acid

(C) STRANDEDNESS: single

(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: oligonucleotide

(ix) FEATURE:

(A) NAME/KEY: PCR primer

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 45:

CAACCAGCTT CCATCTCTTG C

21

(2) INFORMATION FOR SEQ ID NO: 46:

(i) SEQUENCE CHARACTERISTICS:

(A) LENGTH: 21 bases

(B) TYPE: nucleic acid

(C) STRANDEDNESS: single

(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: oligonucleotide

(ix) FEATURE:

(A) NAME/KEY: PCR primer

25
98

100

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 46:

AGATTCCAGT TTGGATACCA A

21

(2) INFORMATION FOR SEQ ID NO: 47:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 24 bases
- (B) TYPE: nucleic acid
- (C) STRANDEDNESS: single
- (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: oligonucleotide

(ix) FEATURE:

- (A) NAME/KEY: PCR primer

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 47:

TTGGTATCCA AACTGGAATC TGGG

24

(2) INFORMATION FOR SEQ ID NO: 48:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 24 bases
- (B) TYPE: nucleic acid
- (C) STRANDEDNESS: single
- (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: oligonucleotide

(ix) FEATURE:

- (A) NAME/KEY: PCR primer

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 48:

ATGGGTAAAT TGCATGCAGT AATA

24

~~26~~
~~95~~

101

(2) INFORMATION FOR SEQ ID NO: 49:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 24 bases
- (B) TYPE: nucleic acid
- (C) STRANDEDNESS: single
- (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: oligonucleotide

(ix) FEATURE:

- (A) NAME/KEY: PCR primer

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 49:

TACTGCATGC AATTTACCCA TTAT

24

(2) INFORMATION FOR SEQ ID NO: 50:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 26 bases
- (B) TYPE: nucleic acid
- (C) STRANDEDNESS: single
- (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: oligonucleotide

(ix) FEATURE:

- (A) NAME/KEY: PCR primer

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 50:

GATCGGATCC AACTGAGGAA GCAAAG

26

(2) INFORMATION FOR SEQ ID NO: 51:

(i) SEQUENCE CHARACTERISTICS:

-27-
100

102

- (A) LENGTH: 30 amino acids
- (B) TYPE: amino acid
- (C) STRANDEDNESS:
- (D) TOPOLOGY: linear

- (ii) MOLECULE TYPE: polypeptide
- (xi) SEQUENCE DESCRIPTION: SEQ ID NO: 51:

Glu Val Gln Leu Gln Gln Ser Gly Pro Glu

5 10

Leu Gln Arg Pro Gly Ala Ser Val Lys Leu

15 20

Ser Cys Lys Ala Ser Gly Tyr Ile Phe Thr

25 30

(2) INFORMATION FOR SEQ ID NO: 52:

- (i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 30 amino acids
- (B) TYPE: amino acid
- (C) STRANDEDNESS:
- (D) TOPOLOGY: linear

- (ii) MOLECULE TYPE: polypeptide
- (xi) SEQUENCE DESCRIPTION: SEQ ID NO: 52:

Gln Val Gln Leu Val Gln Ser Gly Ala Glu

5 10

Val Lys Lys Pro Gly Ala Ser Val Lys Val

15 20

28
101

103

Ser Cys Lys Ala Ser Gly Tyr Thr Phe Thr

25

30

(2) INFORMATION FOR SEQ ID NO: 53:

(i) SEQUENCE CHARACTERISTICS:

(A) LENGTH: 14 amino acids

(B) TYPE: amino acid

(C) STRANDEDNESS:

(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: polypeptide

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 53:

Trp Val Lys Gln Arg Pro Lys Gln Gly Leu

5

10

Glu Leu Val Gly

(2) INFORMATION FOR SEQ ID NO: 54:

(i) SEQUENCE CHARACTERISTICS:

(A) LENGTH: 14 amino acids

(B) TYPE: amino acid

(C) STRANDEDNESS:

(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: polypeptide

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 54:

Trp Val Arg Gln Ala Pro Gly Gln Gly Leu

5

10

-29
102

104

Glu Trp Met Gly

(2) INFORMATION FOR SEQ ID NO: 55:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 32 amino acids
- (B) TYPE: amino acid
- (C) STRANDEDNESS:
- (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: polypeptide

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 55:

Lys Ala Thr Leu Thr Ala Asp Thr Ser Ser

5 10

Asn Thr Ala Tyr Met Gln Leu Ser Ser Leu

15 20

Thr Ser Glu Asp Thr Ala Thr Tyr Phe Cys

25 30

Ala Arg

(2) INFORMATION FOR SEQ ID NO: 56:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 32 amino acids
- (B) TYPE: amino acid
- (C) STRANDEDNESS:
- (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: polypeptide

-30-
103

105

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 56:

Arg Val Thr Met Thr Arg Asp Thr Ser Ile

5 10

Ser Thr Ala Tyr Met Glu Leu Ser Arg Leu

15 20

Arg Ser Asp Asp Thr Ala Val Tyr Tyr Cys

25 30

Ala Arg

(2) INFORMATION FOR SEQ ID NO: 57:

(i) SEQUENCE CHARACTERISTICS:

(A) LENGTH: 11 amino acids

(B) TYPE: amino acid

(C) STRANDEDNESS:

(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: polypeptide

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 57:

Trp Gly Gln Gly Thr Leu Val Thr Val Ser

5 10

Ser

(2) INFORMATION FOR SEQ ID NO: 58:

(i) SEQUENCE CHARACTERISTICS:

(A) LENGTH: 11 amino acids

(B) TYPE: amino acid

*31-
104*

106

(C) STRANDEDNESS:

(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: polypeptide

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 58:

Trp Gly Gln Gly Thr Leu Val Thr Val Ser

5

10

Ser

(2) INFORMATION FOR SEQ ID NO: 59:

(i) SEQUENCE CHARACTERISTICS:

(A) LENGTH: 88 bases

(B) TYPE: nucleic acid

(C) STRANDEDNESS: single

(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: oligonucleotide

(ix) FEATURE:

(A) NAME/KEY: PCR primer

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 59:

GATCAAGCTT CATGAAATGC AGGTGGATCA TCCTCTTCTT GATGGCAGTA GCTACAGGTA

60

AGGCACCTCCC AAGTCCTAAA CTTGAGAG

88

(2) INFORMATION FOR SEQ ID NO: 60:

(i) SEQUENCE CHARACTERISTICS:

(A) LENGTH: 87 bases

(B) TYPE: nucleic acid

(C) STRANDEDNESS: single

-32-
105

107

(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: oligonucleotide

(ix) FEATURE:

(A) NAME/KEY: PCR primer

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 60:

CACCTGTGAG TTGACCCCTG TTGAAAGAAA TCCAAAGATA GTGTCACTGT CTCCCAAGTG	60
TATGATCTCT CAAGTTAGG ACTTGGG	87

(2) INFORMATION FOR SEQ ID NO: 61:

(i) SEQUENCE CHARACTERISTICS:

(A) LENGTH: 78 bases

(B) TYPE: nucleic acid

(C) STRANDEDNESS: single

(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: oligonucleotide

(ix) FEATURE:

(A) NAME/KEY: PCR primer

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 61:

ACAGGGGTCA ACTCACAGGT GCAGCTGGTG CAGTCTGGGG CTGAGGTGAA GAAGCCTGGG	60
GCCTCAGTGA AGGTCTCC	78

(2) INFORMATION FOR SEQ ID NO: 62:

(i) SEQUENCE CHARACTERISTICS:

(A) LENGTH: 78 bases

(B) TYPE: nucleic acid

(C) STRANDEDNESS: single

-33-
106

108

(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: oligonucleotide

(ix) FEATURE:

(A) NAME/KEY: PCR primer

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 62:

GGCCTGTCGC ACCCAGTACA TATAGTACTC GGTGAAGGTG TATCCAGAAG CCTTGCAGGA	60
GACCTTCACT GAGGCCCC	78

(2) INFORMATION FOR SEQ ID NO: 63:

(i) SEQUENCE CHARACTERISTICS:

(A) LENGTH: 78 bases

(B) TYPE: nucleic acid

(C) STRANDEDNESS: single

(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: oligonucleotide

(ix) FEATURE:

(A) NAME/KEY: PCR primer

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 63:

ATGTACTGGG TGCGACAGGC CCCTGGACAA GGGCTTGAGC TGATGGGAAG GATCGATCCT	60
GAAGACGGTA GTATTGAT	78

(2) INFORMATION FOR SEQ ID NO: 64:

(i) SEQUENCE CHARACTERISTICS:

(A) LENGTH: 78 bases

(B) TYPE: nucleic acid

(C) STRANDEDNESS: single

34
107

109

(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: oligonucleotide

(ix) FEATURE:

(A) NAME/KEY: PCR primer

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 64:

TGTGCTAGAG GACGTGTCAG CGGTCAGGGT GACCTTTTTC TTAAACTTCT CAACATAATC	60
AATACTACCG TCTTCAGG	78

(2) INFORMATION FOR SEQ ID NO: 65:

(i) SEQUENCE CHARACTERISTICS:

(A) LENGTH: 84 bases

(B) TYPE: nucleic acid

(C) STRANDEDNESS: single

(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: oligonucleotide

(ix) FEATURE:

(A) NAME/KEY: PCR primer

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 65:

GCTGACACGT CCTCTAGCAC AGCCTACATG GAGCTGAGCA GCCTGACCTC TGACGACACG	60
GCCGTGTATT ACTGTGCGAG AGGA	84

(2) INFORMATION FOR SEQ ID NO: 66:

(i) SEQUENCE CHARACTERISTICS:

(A) LENGTH: 87 bases

(B) TYPE: nucleic acid

(C) STRANDEDNESS: single

35
108

110

(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: oligonucleotide

(ix) FEATURE:

(A) NAME/KEY: PCR primer

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 66:

GGACTCACCT GAGGAGACGG TGACCAGGGT TCCTTGGCCC CAGTAAGCAA ACCTATAGTT	60
AAACTTTCCCT CTCGCACAGT AATACAC	87

(2) INFORMATION FOR SEQ ID NO: 67:

(i) SEQUENCE CHARACTERISTICS:

(A) LENGTH: 69 bases

(B) TYPE: nucleic acid

(C) STRANDEDNESS: single

(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: oligonucleotide

(ix) FEATURE:

(A) NAME/KEY: PCR primer

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 67:

ACCGTCTCCT CAGGTGAGTC CTTACAACCT CTCTCTTCTA TTCAGCTTAA ATAGATTTA	60
CTGCATTTG	69

(2) INFORMATION FOR SEQ ID NO: 68:

(i) SEQUENCE CHARACTERISTICS:

(A) LENGTH: 69 bases

(B) TYPE: nucleic acid

(C) STRANDEDNESS: single

-36-
107

///

(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: oligonucleotide

(ix) FEATURE:

(A) NAME/KEY: PCR primer

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 68:

CCTAGTCCTT CATGACCTGA AATTCAGATA CACACATTTC CCCCCCAACA AATGCAGTAA	60
AATCTATTT	69

(2) INFORMATION FOR SEQ ID NO: 69:

(i) SEQUENCE CHARACTERISTICS:

(A) LENGTH: 72 bases

(B) TYPE: nucleic acid

(C) STRANDEDNESS: single

(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: oligonucleotide

(ix) FEATURE:

(A) NAME/KEY: PCR primer

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 69:

TTCAGGTCAT GAAGGACTAG GGACACCTTG GGAGTCAGAA AGGGTCATTG GGAGCCGGG	60
CTGATGCAGA CA	72

(2) INFORMATION FOR SEQ ID NO: 70:

(i) SEQUENCE CHARACTERISTICS:

(A) LENGTH: 72 bases

(B) TYPE: nucleic acid

(C) STRANDEDNESS: single

37
110

112

(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: oligonucleotide

(ix) FEATURE:

(A) NAME/KEY: PCR primer

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 70:

GATCGGATCC CTATAAATCT CTGGCCATGA AGTCTGGGAG CTGAGGATGT CTGTCTGCAT	60
CAGCCCCGGGC TC	72

(2) INFORMATION FOR SEQ ID NO: 71:

(i) SEQUENCE CHARACTERISTICS:

(A) LENGTH: 25 bases

(B) TYPE: nucleic acid

(C) STRANDEDNESS: single

(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: oligonucleotide

(ix) FEATURE:

(A) NAME/KEY: PCR primer

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 71:

GATCAAGCTT CATGAAATGC AGGTG	25
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(2) INFORMATION FOR SEQ ID NO: 72:

(i) SEQUENCE CHARACTERISTICS:

(A) LENGTH: 23 bases

(B) TYPE: nucleic acid

(C) STRANDEDNESS: single

(D) TOPOLOGY: linear

-38-
161

113

(ii) MOLECULE TYPE: oligonucleotide

(ix) FEATURE:

(A) NAME/KEY: PCR primer

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 72:

CACCTGTGAG TTGACCCCTG TTG

23

(2) INFORMATION FOR SEQ ID NO: 73:

(i) SEQUENCE CHARACTERISTICS:

(A) LENGTH: 21 bases

(B) TYPE: nucleic acid

(C) STRANDEDNESS: single

(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: oligonucleotide

(ix) FEATURE:

(A) NAME/KEY: PCR primer

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 73:

ACAGGGGTCA ACTCACAGGT G

21

(2) INFORMATION FOR SEQ ID NO: 74:

(i) SEQUENCE CHARACTERISTICS:

(A) LENGTH: 21 bases

(B) TYPE: nucleic acid

(C) STRANDEDNESS: single

(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: oligonucleotide

(ix) FEATURE:

-39-
112

114

(A) NAME/KEY: PCR primer

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 74:

GGCCTGTCGC ACCCAGTACA T

21

(2) INFORMATION FOR SEQ ID NO: 75:

(i) SEQUENCE CHARACTERISTICS:

(A) LENGTH: 21 bases

(B) TYPE: nucleic acid

(C) STRANDEDNESS: single

(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: oligonucleotide

(ix) FEATURE:

(A) NAME/KEY: PCR primer

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 75:

ATGTACTGGG TGCGACAGGC C

21

(2) INFORMATION FOR SEQ ID NO: 76:

(i) SEQUENCE CHARACTERISTICS:

(A) LENGTH: 21 bases

(B) TYPE: nucleic acid

(C) STRANDEDNESS: single

(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: oligonucleotide

(ix) FEATURE:

(A) NAME/KEY: PCR primer

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 76:

-40-

113

115

TGTGCTAGAG GACGTGTCAG C

21

(2) INFORMATION FOR SEQ ID NO: 77:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 21 bases
- (B) TYPE: nucleic acid
- (C) STRANDEDNESS: single
- (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: oligonucleotide

(ix) FEATURE:

- (A) NAME/KEY: PCR primer

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 77:

GCTGACACGT CCTCTAGCAC A

21

(2) INFORMATION FOR SEQ ID NO: 78:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 21 bases
- (B) TYPE: nucleic acid
- (C) STRANDEDNESS: single
- (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: oligonucleotide

(ix) FEATURE:

- (A) NAME/KEY: PCR primer

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 78:

GGACTCACCT GAGGAGACGG T

21

41
114

116

(2) INFORMATION FOR SEQ ID NO: 79:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 21 bases
- (B) TYPE: nucleic acid
- (C) STRANDEDNESS: single
- (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: oligonucleotide

(ix) FEATURE:

- (A) NAME/KEY: PCR primer

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 79:

ACCGTCTCCT CAGGTGAGTC C

21

(2) INFORMATION FOR SEQ ID NO: 80:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 21 bases
- (B) TYPE: nucleic acid
- (C) STRANDEDNESS: single
- (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: oligonucleotide

(ix) FEATURE:

- (A) NAME/KEY: PCR primer

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 80:

CCTAGTCCTT CATGACCTGA A

21

(2) INFORMATION FOR SEQ ID NO: 81:

(i) SEQUENCE CHARACTERISTICS:

42
15

//7

- (A) LENGTH: 21 bases
- (B) TYPE: nucleic acid
- (C) STRANDEDNESS: single
- (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: oligonucleotide

(ix) FEATURE:

- (A) NAME/KEY: PCR primer

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 81:

.TTCAGGTCAT GAACGACTAG G

21

(2) INFORMATION FOR SEQ ID NO: 82:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 26 bases
- (B) TYPE: nucleic acid
- (C) STRANDEDNESS: single
- (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: oligonucleotide

(ix) FEATURE:

- (A) NAME/KEY: PCR primer

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 82:

GATCGGATCC CTATAAATCT CTGGCC

26

(2) INFORMATION FOR SEQ ID NO: 83:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 761 bases
- (B) TYPE: nucleic acid

43
116

118

(C) STRANDEDNESS: single

(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: oligonucleotide

(ix) FEATURE:

(A) NAME/KEY: Nucleotide sequence encoding LO-CD2a

V_L chain.

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 83:

ATGATGAGTC CTGTCCAGTC CCTGTTCTG TTATTGCTTT GGATTCTGGG TAAGTAGAGA	60
ATGAGTTACA GGACAAGAAT GGGGATGGAG GATGAGTTCT GACTGCCAT GTTGGCTGTC	120
CATGTGTGGT AAGGCAGGTC CTATTTCTA AGATGGACAC TTGAGATTCC ATTACTTGAT	180
AATGAGAAAT TACAGATGAG ATAGGATTTG TGCTAAGAGG ATTCTAATGT AGATGAGAAG	240
GTGTATGCCA TTTAGGATCT GCAACCGAAT TGTTTGTGA AAAAGCATTG GGTATATTTT	300
TTAAAAATCA CAAAACACAC CGGGATCTCA CAGGAAATGA GTAACAAAAA GTAATTACACA	360
AAGATTGGTT GCAAATTTTG CACATAACTT TGTTCTGATC TATTATAATT TCAGGAACCA	420
ATGGTGATGT TGTGCTGACC CAGACTCCAC CTACTTTATT GGCTACCATT GGACAATCAG	480
TCTCCATCTC TTGCAGGTCA AGTCAGAGTC TCTTACATAG TAGTGGAAAC ACCTATTTAA	540
ATTGGTTGCT ACAGAGGACA GGCCAATCTC CACAGCCGCT AATTTATTTG GTATCCAAAC	600
TGGAATCTGG GGTCCCCAAC AGGTTCAGTG GCAGTGGTC AGGAACAGAT TTCACACTCA	660
AAATCAGTGG AGTGGAAAGCT GAGGATTTGG GGGTTTATTA CTGCATGCAA TTTACCCATT	720
ATCCGTACAC GTTTGGAGCT GGGACCAAGC TGGAACTGAA A	761

(2) INFORMATION FOR SEQ ID NO: 84:

(i) SEQUENCE CHARACTERISTICS:

(A) LENGTH: 132 amino acids

(B) TYPE: amino acid

(C) STRANDEDNESS:

(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: polypeptide

44
117

119

(ix) FEATURE:

(A) NAME/KEY: Chimeric LO-CD2a V_L Chain

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 84:

Met Met Ser Pro Val Gln Ser Leu Phe

-20 -15

Leu Leu Leu Leu Trp Ile Leu Gly Thr Asn

-10 -5

Gly Asp Val Val Leu Thr Gln Thr Pro

-1 +1 5

Pro Thr Leu Leu Ala Thr Ile Gly Gln Ser

10 15

Val Ser Ile Ser Cys Arg Ser Ser Gln Ser Leu

20 25

Leu His Ser Ser Gly Asn Thr Tyr Leu Asn Trp

30 35 40

Leu Leu Gln Arg Thr Gly Gln Ser Pro Gln

45 50

Pro Leu Ile Tyr Leu Val Ser Lys Leu Glu

55 60

Ser Gly Val Pro Asn Arg Phe Ser Gly Ser

65 70

Gly Ser Gly Thr Asp Phe Thr Leu Lys Ile

75 80

Ser Gly Val Glu Ala Glu Asp Leu Gly Val

45-
118

120

85	90
Tyr Tyr Cys Met Gln Phe Thr His Tyr Pro	
95	100
Tyr Thr Phe Gly Ala Gly Thr Lys Leu Glu	
105	110
Leu Lys	

(2) INFORMATION FOR SEQ ID NO: 85:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 491 bases
- (B) TYPE: nucleic acid
- (C) STRANDEDNESS: single
- (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: oligonucleotide

(ix) FEATURE:

(A) NAME/KEY: Nucleotide sequence encoding LO-CD2a

V_H chain.

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 85:

ATGAAATGCA GGTGGATCAT CCTCTTCITG ATGGCAGTAG CTACAGGTAA GGCACCTCCA	60
AGTCCTAAAC TTGAGAGATC ATACACTTGG GAGACAGTGA CACTATCTTT GGATTTCTTT	120
CAACAGGGGT CAACTCAGAA GTCCAGCTGC AGCAATCTGG GCCTGAGCTT CAGAGACCCG	180
GGGCCTCAGT CAAGTTGTCG TGCAAGGCTT CTGGCTATAT ATTTACAGAA TACTATATGT	240
ACTGGGTGAA GCAGAGGCCT AACACAGGGCC TGGAAATTAGT AGGAAGGATC GATCCTGAAG	300
ACGGTAGTAT TGATTATGTT GAGAAGTTCA AAAAGAAGGC CACACTGACT GCAGATACAT	360
CGTCCAACAC AGCCTACATG CAACTCAGCA GCCTGACATC TGAGGACACA GCAACCTATT	420
TTTGTGCTAG GGGAAAATTC AACTATCGAT TTGCTTACTG GGGCCAAGGC ACCCTCGTCA	480
CAGTCTCCTC A	491

*46-
119*

121

(2) INFORMATION FOR SEQ ID NO: 86:

(i) SEQUENCE CHARACTERISTICS:

(A) LENGTH: 137 amino acids

(B) TYPE: amino acid

(C) STRANDEDNESS:

(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: polypeptide

(ix) FEATURE:

(A) NAME/KEY: Amino acid sequence of chimeric LO-
CD2a V_H chain.

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 86:

Met Lys Cys Arg Trp Ile Ile Leu Phe Leu

-19 -15 -10

Thr Gly Val Asn Ser Glu

Cl¹ Cl² S¹ Cl¹ Cl² S² Cl¹ Cl² P₁₁₁ Cl¹

— 18 —

Leu Cys Arg Pro Gly Ala Ser Val Iys Leu

15 20

Ser Cys Lys Ala Ser Gly Tyr Ile Phe Thr

25 30

Glu Tyr Tyr Met Tyr Trp Val Lys Gln Arg

35 40

Pro Lys Gln Gly Leu Glu Leu Val Gly Arg

45 50

-47-
120

122

Ile Asp Pro Glu Asp Gly Ser Ile Asp Tyr
55 60
Val Glu Lys Phe Lys Lys Lys Ala Thr Leu
65 70
Thr Ala Asp Thr Ser Ser Asn Thr Ala Tyr
75 80
Met Gln Leu Ser Ser Leu Thr Ser Glu Asp
85 90
Thr Ala Thr Tyr Phe Cys Ala Arg Gly Lys
95 100
Phe Asn Tyr Arg Phe Ala Tyr Trp Gly Gln
105 110
Gly Thr Leu Val Thr Val Ser Ser
115

(2) INFORMATION FOR SEQ ID NO: 87:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 112 amino acids
- (B) TYPE: amino acid
- (C) STRANDEDNESS:
- (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: polypeptide

(ix) FEATURE:

- (A) NAME/KEY: Rat LO-CD2a light chain variable region.

-48-
121

123

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 87:

Asp Val Val Leu Thr Gln Thr Pro Pro Thr

5 10

Leu Leu Ala Thr Ile Gly Gln Ser Val Ser

15 20

Ile Ser Cys Arg Ser Ser Gln Ser Leu Leu

25 30

His Ser Ser Gly Asn Thr Tyr Leu Asn Trp

35 40

Leu Leu Gln Arg Thr Gly Gln Ser Pro Gln

45 50

Pro Leu Ile Tyr Leu Val Ser Lys Leu Glu

55 60

Ser Gly Val Pro Asn Arg Phe Ser Gly Ser

65 70

Gly Ser Gly Thr Asp Phe Thr Leu Lys Ile

75 80

Ser Gly Val Glu Ala Glu Asp Leu Gly Val

85 90

Tyr Tyr Cys Met Gln Phe Thr His Tyr Pro

95 100

Tyr Thr Phe Gly Ala Gly Thr Lys Leu Glu

105 110

Leu Lys

49-
122

124

(2) INFORMATION FOR SEQ ID NO: 88:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 112 amino acids
- (B) TYPE: amino acid
- (C) STRANDEDNESS:
- (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: polypeptide

(ix) FEATURE:

- (A) NAME/KEY: Humanized LO-CD2a light chain variable region.

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 88:

Asp Val Val Met Thr Gln Ser Pro Pro Ser

5 10

Leu Leu Val Thr Leu Gly Gln Pro Ala Ser

15 20

Ile Ser Cys Arg Ser Ser Gln Ser Leu Leu

25 30

His Ser Ser Gly Asn Thr Tyr Leu Asn Trp

35 40

Leu Leu Gln Arg Pro Gly Gln Ser Pro Gln

45 50

Pro Leu Ile Tyr Leu Val Ser Lys Leu Glu

55 60

Ser Gly Val Pro Asp Arg Phe Ser Gly Ser

65 70

50
123

125

Gly Ser Gly Thr Asp Phe Thr Leu Lys Ile
75 80
Ser Gly Val Glu Ala Glu Asp Val Gly Val
85 90
Tyr Tyr Cys Met Gln Phe Thr His Tyr Pro
95 100
Tyr Thr Phe Gly Gln Gly Thr Lys Leu Glu
105 110
Ile Lys

(2) INFORMATION FOR SEQ ID NO: 89:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 112 amino acids
- (B) TYPE: amino acid
- (C) STRANDEDNESS:
- (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: polypeptide

(ix) FEATURE:

- (A) NAME/KEY: Light chain variable region of
HUM5400

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 89:

Asp Val Val Met Thr Gln Ser Pro Leu Ser

5 10

Leu Pro Val Thr Leu Gly Gln Pro Ala Ser

15 20

-51-
124

126

Ile Ser Cys Arg Ser Ser Gln Ser Leu Val
25 30
Tyr Ser Asp Gly Asn Thr His Leu Asn Trp
35 40
Phe Gln Gln Arg Pro Gly Gln Ser Pro Arg
45 50
Arg Leu Ile Tyr Lys Val Ser Asn Arg Asp
55 60
Ser Gly Val Pro Asp Arg Phe Ser Gly Ser
65 70
Gly Ser Gly Thr Asp Phe Thr Leu Lys Ile
75 80
Ser Arg Val Glu Ala Glu Asp Val Gly Val
85 90
Tyr Tyr Cys Met Gln Gly Thr His Trp Pro
95 100
Tyr Thr Phe Gly Gln Gly Thr Lys Leu Glu
105 110
Ile Lys

(2) INFORMATION FOR SEQ ID NO: 90:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 807 bases
- (B) TYPE: nucleic acid
- (C) STRANDEDNESS: single

-52-
125

127

(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: polynucleotide

(ix) FEATURE:

(A) NAME/KEY: Nucleotide sequence encoding
humanized LO-CD2a light chain variable region.

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 90:

AAGCTTCATG ATGAGTCCTG TCCAGTCCTC GTTTCTGTTA TTGCTTTGGA TTCTGGTAA	60
GTAGAGAATG AGTTACAGGA CAAGAATGGG GATGGAGGAT GAGTTCTGAC TGCCCATGTT	120
GGCTGTCCAT GTGTGGTAAG GCAGGTCCCTA TTTTCTAAGA TGGACACTTG AGATTCCATT	180
ACTTGATAAT GAGAAATTAC AGATGAGATA GGATTGTGC TAAGAGGATT CTAATGTAGA	240
TGAGAAGGTG TATGCCATT AGGATCTGCA ACCGAATTGT TTGTGAAAA AGCATTTGGT	300
ATATTTTTTA AAAATCACAA AACACACCGG GATCTCACAG GAAATGAGTA ACAAAAAGTA	360
ATTCACAAAG ATTGGTTGCA AATTTTGAC ATAACCTTGT TCTGATCTAT TATAATTCA	420
GGAAACCAATG GTGATGTTGT GATGACCCAG AGTCCACCTT CATTATTGGT AACCTTGGGA	480
CAACCAGCTT CCATCTCTTG CAGGTCAAGT CAGAGTCTCT TACATAGTAG TGGAAACACC	540
TATTTAAATT GGTTGCTACA GAGGCCAGGC CAATCTCCAC AGCCGCTAAT TTATTTGGTA	600
TCCAAACTGG AATCTGGGGT CCCCGACAGG TTCAGTGGCT CAGGGAGTGG AACAGATTTC	660
ACACTCAAAA TCAGTGGAGT GGAAGCTGAG GATGTGGGGG TTTATTACTG CATGCAATT	720
ACCCATTATC CGTACACGTT TGGACAAGGG ACCAAGCTGG AAATCAAACG TGAGTAGAAT	780
TTAAACTTTG CTTCCCTCAGT TGGATCC	807

(2) INFORMATION FOR SEQ ID NO: 91:

(i) SEQUENCE CHARACTERISTICS:

(A) LENGTH: 132 amino acids

(B) TYPE: amino acid

(C) STRANDEDNESS:

(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: polypeptide

*-53
126*

128

(ix) FEATURE:

(A) NAME/KEY: Humanized LO-CD2a light chain
variable region.

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 91:

Met Met Ser Pro Val Gln Ser Leu Phe Leu Leu
-20 -15 -10
Leu Leu Trp Ile Leu Gly Thr Asn Gly Asp
-5 -1 +1
Val Val Met Thr Gln Ser Pro Pro Ser
5 10
Leu Leu Val Thr Leu Gly Gln Pro Ala Ser
15 20
Ile Ser Cys Arg Ser Ser Gln Ser Leu Leu
25 30
His Ser Ser Gly Asn Thr Tyr Leu Asn Trp
35 40
Leu Leu Gln Arg Pro Gly Gln Ser Pro Gln
45 50
Pro Leu Ile Tyr Leu Val Ser Lys Leu Glu
55 60
Ser Gly Val Pro Asp Arg Phe Ser Gly Ser
65 70
Gly Ser Gly Thr Asp Phe Thr Leu Lys Ile
75 80
Ser Gly Val Glu Ala Glu Asp Val Gly Val

54
127

129

85 90
Tyr Tyr Cys Met Gln Phe Thr His Tyr Pro
95 100
Tyr Thr Phe Gly Gln Gly Thr Lys Leu Glu
105 110
Ile Lys

(2) INFORMATION FOR SEQ ID NO: 92:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 118 amino acids
- (B) TYPE: amino acid
- (C) STRANDEDNESS:
- (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: polypeptide

(ix) FEATURE:

- (A) NAME/KEY: Rat LO-CD2a heavy chain variable region.

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 92:

Glu Val Gln Leu Gln Gln Ser Gly Pro Glu

5 10

Leu Gln Arg Pro Gly Ala Ser Val Lys Leu

15 20

Ser Cys Lys Ala Ser Gly Tyr Ile Phe Thr

25 30

Glu Tyr Tyr Met Tyr Trp Val Lys Gln Arg

-55
128

130

35	40
Pro Lys Gln Gly Leu Glu Leu Val Gly Arg	
45	50
Ile Asp Pro Glu Asp Gly Ser Ile Asp Tyr	
55	60
Val Glu Lys Phe Lys Lys Ala Thr Leu	
65	70
Thr Ala Asp Thr Ser Ser Asn Thr Ala Tyr	
75	80
Met Gln Leu Ser Ser Leu Thr Ser Glu Asp	
85	90
Thr Ala Thr Tyr Phe Cys Ala Arg Gly Lys	
95	100
Phe Asn Tyr Arg Phe Ala Tyr Trp Gly Gln	
105	110
Gly Thr Leu Val Thr Val Ser Ser	
115	

(2) INFORMATION FOR SEQ ID NO: 93:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 118 amino acids
- (B) TYPE: amino acid
- (C) STRANDEDNESS:
- (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: polypeptide

~~56~~
129

131

(ix) FEATURE:

(A) NAME/KEY: Humanized LO-CD2a heavy chain
variable region.

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 93:

Gln Val Gln Leu Val Gln Ser Gly Ala Glu

5 10

Val Lys Lys Pro Gly Ala Ser Val Lys Val

15 20

Ser Cys Lys Ala Ser Gly Tyr Thr Phe Thr

25 30

Glu Tyr Tyr Met Tyr Trp Val Arg Gln Ala

35 40

Pro Gly Gln Gly Leu Glu Leu Met Gly Arg

45 50

Ile Asp Pro Glu Asp Gly Ser Ile Asp Tyr

55 60

Val Glu Lys Phe Lys Lys Lys Val Thr Leu

65 70

Thr Ala Asp Thr Ser Ser Ser Thr Ala Tyr

75 80

Met Glu Leu Ser Ser Leu Thr Ser Asp Asp

85 90

Thr Ala Val Tyr Tyr Cys Ala Arg Gly Lys

95 100

Phe Asn Tyr Arg Phe Ala Tyr Trp Gly Gln

57-
130

132

105

110

Gly Thr Leu Val Thr Val Ser Ser

115

(2) INFORMATION FOR SEQ ID NO: 94:

(i) SEQUENCE CHARACTERISTICS:

(A) LENGTH: 123 amino acids

(B) TYPE: amino acid

(C) STRANDEDNESS:

(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: polypeptide

(ix) FEATURE:

(A) NAME/KEY: Human Amu 5-3 heavy chain variable region.

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 94:

Gln Val Gln Leu Val Gln Ser Gly Ala Glu

5

10

Val Lys Lys Pro Gly Ala Ser Val Lys Val

15

20

Ser Cys Lys Ala Ser Gly Tyr Thr Phe Thr

25

30

Gly Tyr Tyr Met His Trp Val Arg Gln Ala

35

40

Pro Gly Gln Gly Leu Glu Trp Met Gly Arg

45

50

58
B1

133

Ile Asn Pro Asn Ser Gly Gly Thr Asn Tyr
55 60
Ala Gln Lys Phe Gln Gly Arg Val Thr Met
65 70
Thr Arg Asp Thr Ser Ile Ser Thr Ala Tyr
75 80
Met Glu Leu Ser Arg Leu Arg Ser Asp Asp
85 90
Thr Ala Val Tyr Tyr Cys Ala Arg Gly Arg
95 100
Thr Glu Tyr Ile Val Val Ala Glu Gly Phe
105 110
Asp Tyr Trp Gly Gln Gly Thr Leu Val Thr
115 120
Val Ser Ser

(2) INFORMATION FOR SEQ ID NO: 95:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 701 bases
- (B) TYPE: nucleic acid
- (C) STRANDEDNESS: single
- (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: polynucleotide

(ix) FEATURE:

(A) NAME/KEY: Nucleotide sequence encoding LO-CD2a heavy chain variable region.

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 95:

AAGCTTCATG AAATGCAGGT GGATCATCCT CTTCTTGATG GCAGTAGCTA CAGGTAAGGC	60
ACTCCCAAGT CCTAAACTTG AGAGATCATA CACTGGGAG ACAGTGACAC TATCTTGGA	120
TTTCTTCAA CAGGGTCAA CTCACAGGTG CAGCTGGTGC AGTCTGGGC TGAGGTGAAG	180
AAGCCTGGGG CCTCAGTGA GGTCTCCTGC AAGGCTTCTG GATACACCTT CACCGAGTAC	240
TATATGTACT GGGTGCAGA GGCCCCTGGA CAAGGGCTTG AGCTGATGGG AAGGATCGAT	300
CCTGAAGACG GTAGTATTGA TTATGTTGAG AAGTTAAGA AAAAGGTCAC CCTGACCGCT	360
GACACGTCCT CTAGCACAGC CTACATGGAG CTGAGCAGCC TGACCTCTGA CGACACGGCC	420
GTGTATTACT GTGCGAGAGG AAAGTTAAC TATAGGTTTG CTTACTGGGG CCAAGGAACC	480
CTGGTCACCG TCTCCTCAGG TGAGTCCTTA CAACCTCTCT CTTCTATTCA GCTTAAATAG	540
ATTTTACTGC ATTTGTTGGG GGGGAAATGT GTGTATCTGA ATTCAGGTC ATGAAGGACT	600
AGGGACACCT TGGGAGTCAG AAAGGGTCAT TGGGAGCCCG GGCTGATGCA GACAGACATC	660
CTCAGCTCCC GGACTTCATG GCCAGAGATT TATAGGGATC C	701

(2) INFORMATION FOR SEQ ID NO: 96:

(i) SEQUENCE CHARACTERISTICS:

(A) LENGTH: 137 amino acids

(B) TYPE: amino acid

(C) STRANDEDNESS:

(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: polypeptide

(ix) FEATURE:

(A) NAME/KEY: Humanized LO-CD2a heavy chain variable region.

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 96:

Met Lys Cys Arg Trp Ile Ile Leu Phe Leu

60-
133

135

-19	-15	-10
Met Ala Val Ala Thr Gly Val Asn Ser Gln		
	-5	-1 1
Val Gln Leu Val Gln Ser Gly Ala Glu		
	5	10
Val Lys Lys Pro Gly Ala Ser Val Lys Val		
	15	20
Ser Cys Lys Ala Ser Gly Tyr Thr Phe Thr		
	25	30
Glu Tyr Tyr Met Tyr Trp Val Arg Gln Ala		
	35	40
Pro Gly Gln Gly Leu Glu Leu Met Gly Arg		
	45	50
Ile Asp Pro Glu Asp Gly Ser Ile Asp Tyr		
	55	60
Val Glu Lys Phe Lys Lys Lys Val Thr Leu		
	65	70
Thr Ala Asp Thr Ser Ser Ser Thr Ala Tyr		
	75	80
Met Glu Leu Ser Ser Leu Thr Ser Asp Asp		
	85	90
Thr Ala Val Tyr Tyr Cys Ala Arg Gly Lys		
	95	100
Phe Asn Tyr Arg Phe Ala Tyr Trp Gly Gln		
	105	110

-61-
134

136

Gly Thr Leu Val Thr Val Ser Ser

115

P2cont,

~~62~~
135

137